

This application has been carefully reviewed in light of the Office Action dated June 6, 2001. Claims 1 to 6, 11 to 25, 30 to 39, 42, 47 to 62, 65, 68 to 76 and 79 to 86 are in the application. Of those claims, Claims 1, 20, 31, 54, 84, 85 and 86 are independent.

Reconsideration and further examination are respectfully requested.

The objection to Claims 19 and 30 has been attended to by amendment.

The continued adherence to the restriction requirement is noted, with this being indicated as a petitionable issue. In keeping with this indication, all claims withdrawn from further consideration have been maintained. It is Applicants' current intention to file such a Petition, and if the Petition is unsuccessful, then all claims written in dependent form (that is, depending from a withdrawn claim) will be rewritten in independent form. Claims 79 to 86 have been added, of which Claims 80, 81 and 84 to 86 are directed to the elected invention.

The continued objection to use of trademarks is noted. The cited portions of the specification have again been reviewed, but since they include generic terminology as well as proper identification as a trademark together with attribution to the trademark holder, it is believed that the specification complies with the Patent Office guidelines. Should the Examiner's sole objection be to capitalization, then he is authorized to capitalize the terms at his end.

Claims 18, 42 and 65 were objected to under 37 C.F.R. § 1.75(c) for allegedly being in improper dependent form. The objection is respectfully traversed, since the claims in question very clearly comply with actual examples given by the Patent Office. See, for example, MPEP § 608.01(n).

Claims 18 to 21, 28, 30, 42, 45, 65, 71, 72 and 76 were rejected under 35 U.S.C. § 102(a) over European 771,662 (Yamamoto '662); Claims 18 to 30, 42 to 53, and 65 to 68 were rejected under § 103(a) over U.S. Patent 5,748,088 (Ujita '088) in view of U.S. Patent 5,509,140 (Koitabashi '140); Claims 22 to 27, 29, 43, 44, 46 to 53, 66 to 70, 73 to 75, 77 and 78 were rejected under § 103(a) over Yamamoto in view of Great Britain 2,059,975 (Okamoto); and Claims 18 to 30, 42 to 53 and 65 to 78 were rejected for obviousness-type double patenting over issued Claims 1 to 22 of U.S. Patent 6,234,618 (Yamamoto '618). The rejections are all respectfully traversed.

According to one aspect of the invention, a fibrous material is obtained by a process comprising the steps of providing a spun yarn by melt-spinning a thermoplastic resin, and subjecting the spun yarn to a glycol treatment in which the spun yarn is contacted with ethylene oxide adduct of glycol having a cloud point of at least 65°C.

According to further aspects, a fibrous material is composed of a thermoplastic resin, wherein a ethylene oxide adduct of glycol having a cloud point of at least 65°C is applied to the thermoplastic resin. An ink contacting member and an ink-absorbing member comprising such fibrous materials are further claimed.

According to still further aspects of the invention, an ink-absorbing member is formed by a process comprising the step of treating a molding having a fibrous material composed of thermoplastic resin with a treating agent which contains ethylene oxide adduct of glycol having a cloud point of at least 65°C. An ink container, an ink tank, an ink-jet cartridge and an ink jet apparatus each comprising such an ink absorbing member is also claimed.

These inventions are all directed to a known problem in ink jet recording technology, namely deterioration in ink jet recording properties. One cause for such deterioration is elution into ink or adherence onto ink ejection openings of additives contained in the raw material resin of the fibrous material composing an ink contacting member, or oil components applied during production of the fibrous material. A variety of solutions to this problem have been proposed, such as modification of the additive itself as well as cleaning of the fibrous materials prior to charging with ink. The inventors herein have contributed a different solution.

According to the contribution provided by the inventors herein, a substance is added having a function as a replacing agent for fibrous materials so as to provide a self-cleaning ability to the fibrous material itself. The substance has a replacement function in that it removes from the fibrous material substances which affect ink-jet properties, and turn them into a colloidal aggregate which sticks to the fibrous material. In particular, the inventors have found that an ethylene oxide adduct of glycol having a cloud point of at least 65°C is an excellent substance. When used, substances which affect ink-jet property are enclosed within the colloidal aggregate of the ethylene oxide adduct of glycol, so that ink ejection is not adversely affected. Moreover, the inventors have confirmed that when adhered to the surface of the fibrous materials, the ethylene oxide adduct of glycol satisfactorily provides an anti-static effect as well as a lubrication effect.

By contrast, Yamamoto '662 and Yamamoto '618 both teach that a surfactant is applied to a fibrous material for use in an ink tank, and that the surfactant is preferably non-ionic. Neither teaches the technical problem addressed by the invention herein, namely

deterioration of suitability for ink jet recording, nor the technical concept for solving such a problem, namely, a fibrous material to which a substance having a replacement function is applied so as to enclose the substances that cause such a problem into a colloidal aggregate. Moreover, these references do not teach or in any way suggest an ethylene oxide adduct of glycol, having a cloud point of at least 65°C.

Ujita '088 relates to an ink cartridge comprising an ink-leading member. Ujita describes an ink absorbing member composed of fibrous material, and teaches that it is preferable to use materials having a small contact angle with respect to ink, with a treatment for a hydrophilic property when materials having a large contact angle are used.

Koitabashi '140 shows the construction of an ink cartridge, and specifically mentions that a surfactant is added to ink in order to increase the contact angle. Lines 5 and 6 in Koitabashi's column 39 mentions ethylene oxide adduct of acetylene glycol as an example of such a surfactant.

The Office Action took the position that Ujita '088 and Koitabashi '140 could be combined successfully. However, the object in Ujita '088 is to treat a solid, whereas the object in Koitabashi is to treat a liquid (that is, the ink). Absolutely nothing could be learned from Koitabashi's mention of ethylene oxide adduct of acetylene glycol, which is used in Koitabashi '140 to treat ink, with respect to Ujita's treatment of fibers.

Okamoto discloses a surfactant contained in a soaping agent to remove unfixed dyes when dyeing polyester-containing fabrics. Ethylene oxide adduct of polyhydric alcohols is an example of such a soaping agent. Use in a soaping agent, according to Okamoto, is

fundamentally different from use of ethylene oxide in the present invention, such that the combination proposed in the Office Action cannot be maintained.

It is therefore respectfully submitted that the claims herein are fully in condition for allowance, and such action is courteously solicited. In addition, the Examiner is again respectfully requested to rejoin the withdrawn claims, pursuant to MPEP § 806.05(i).

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our address given below.

Respectfully submitted,

  
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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Twice Amended) A process for producing a fibrous material comprising:  
providing a spun yarn by melt spinning a thermoplastic resin; and  
subjecting the spun yarn to a glycol treatment in which the spun yarn is contacted  
with an ethylene oxide adduct of a glycol having a cloud point of at least 65°C.

7. (Cancelled)

8. (Cancelled)

9. (Cancelled)

10. (Cancelled)

11. (Three Times Amended) The process according to Claim [10] 1, wherein the  
glycol is an acetylene glycol having a triple bond, and having at least one side chain at a central  
site of a linear main chain, with ethylene oxide added to the side chain.

12. (Twice Amended) The process according to Claim 11, wherein the glycol  
exhibits a nonionic surface activity [and has a dew point of at least 65°C].

16. (Amended) The process according to Claim 1 or 15, wherein the thermoplastic resin is a resin for obtaining a heat-adhesive fibrous material.

19. (Twice Amended) An ink-absorbing member [which can] constructed to deliverably hold an ink-jet ink therein, comprising the fibrous materials according to Claim 18.

20. (Twice Amended) A fibrous material composed of a thermoplastic resin, to which is added an ethylene oxide adduct of a glycol [is applied] having a cloud point of at least 65°C.

24. (Twice Amended) The fibrous material according to Claim 23, wherein the glycol exhibits an anionionic surface activity [and has a dew point of at least 65°C].

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Three Times Amended) An ink-absorbing member [which can] constructed  
to deliverably hold an ink-jet ink therein, comprising the fibrous materials according to Claim  
20.

31. (Twice Amended) A process for treating an ink-absorbing member which  
can deliverably hold an ink-jet ink therein, the process comprising the steps of:

treating a molding comprising a fibrous material composed of a thermoplastic  
resin with a treating agent containing an ethylene oxide adduct of a glycol having a cloud point  
of at least 65°C.

33. (Amended) The process according to Claim 32, wherein the glycol exhibits a  
nonionic surface activity [and has a cloud point of at least 65°C].

38. (Amended) The process according to Claim [37] 31, wherein the  
thermoplastic resin is at least one selected from the group consisting of polyethylene,  
polypropylene, ethylene-propylene copolymers, polymethylpentene and ethylene-olefin  
copolymers.

40. (Cancelled)



41. (Cancelled)

42. (Three Times Amended) An ink-absorbing member treated in accordance with the treatment process according to any one of Claims 31 to [41] 39 or 82.

43. (Cancelled)

44. (Cancelled)

45. (Cancelled)

46. (Cancelled)

47. (Three Times Amended) An ink tank container for an ink-jet head comprising an ink chamber having an opening part communicating with air and an ink feed opening connecting to the ink-jet head, wherein the ink-absorbing member according to [any] either one of Claims 19[,], or 30 [or 43 to 46] is fitted within a region including the ink feed opening in the ink chamber.

49. (Three Times Amended) An ink tank container for an ink-jet head comprising an ink chamber having an opening part communicating with air, and a connecting chamber connectable to the ink-jet head, the connecting chamber communicating with the ink chamber and being constructed to feed an ink from the ink chamber to the ink-jet head through a connecting opening to the ink-jet head, wherein the ink-absorbing member according to [any] either one of Claims 19[,] or 30 [or 43 to 46] is fitted within the connecting chamber for providing a negative pressure.

54. (Twice Amended) A treating process for regenerating ink absorbing properties of an ink-absorbing member composed principally of a fibrous material, the process comprising the step of:

treating the ink-absorbing member with a residual ink held therein with a treating agent containing an ethylene oxide adduct of a glycol having a cloud point of at least 65°C.

56. (Twice Amended) The process according to Claim 55, wherein the glycol exhibits nonionic surface activity [and has a dew point of at least 65°C].

63. (Cancelled)

64. (Cancelled)

66. (Cancelled)

67. (Cancelled)

69. (Amended) The fibrous material according to Claim 68, wherein the glycol exhibits a nonionic surface activity [and has a dew point of at least 65 °C].

70. (Amended) The fibrous material according to Claim 68, wherein [th] the glycol is an ethylene oxide adduct of 2,4,7,9-tetramethyl-5-decyn-4,7-diol, in which the number of moles of ethylene oxide is from 3 to 30.

74. (Amended) The ink contacting member according to Claim 73, wherein the glycol exhibits a nonionic surface activity [and has a dew point of at least 65 °C].

77. (Cancelled)

78. (Cancelled)